

Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.



United States
Department of
Agriculture

Forest
Service

Region One

200 East Broadway
P.O. Box 7669
Missoula, MT 59807

File Code: 3420

Date: January 3, 2005

Route To:

Subject: Effectiveness of Reducing Douglas- fir beetle Mortality using Pheromone-baited Funnel Traps on the Helena National Forest (TR-04-47)

To: Forest Supervisor Helena National Forest

During October, Nancy Sturdevant and Ken Gibson, Forest Entomologists, and Jack Kendley and Terry Beaver evaluated Douglas-fir beetle (DFB) caused mortality in areas where funnel traps were used in 2004. Most of the areas evaluated had little to no current beetle activity. The results of this evaluation and other data suggest that DFB activity is probably declining within the fire areas and that tree mortality from Douglas-fir beetle would have been much higher without suppression efforts.

Their observations and evaluation suggest that trapping and the use of MCH, the anti-aggregant pheromone may still be appropriate in the Maudlow-Toston and Cave Gulch areas for an additional year.

The enclosed trip report details their observations, discussions and recommendations. If we can provide additional information, or be of additional assistance, please contact us.

/s/Gregg DeNitto (for)
WILLIAM W. BOETTCHER
Director of State and Private Forestry

cc: Jack Kendley, Sharon A Scott, Terry L Beaver, Gregg DeNitto



Trip Report (TR-04-47)
Effectiveness of Reducing Douglas- fir Beetle Mortality Using Pheromone-Baited
Funnel Traps on the Helena National Forest
November 24, 2004

During October 2004, Ken Gibson, Bill Cramer, Larry Meyer and I assisted Jack Kendley and Terry Beaver from the Helena Ranger District in evaluating the success of their funnel-trapping program for DFB.

Over the past 3 years funnel-trapping was used in combination with other treatment methods such as salvage of infested trees and the anti-aggregation pheromone, MCH, in the Maudlow-Toston and Cave Gulch fires on the Helena NF. Results from previous studies (Gibson et al. 1999) and personal communication (Pat Shea), suggest that funnel trapping usually requires a multi-year effort and should be continued in an area until beetle populations have significantly declined.

In 2003, very little DFB-caused mortality occurred in areas treated with funnel traps on the Helena NF. In addition to ground surveys, the 2003 aerial detection survey showed very little beetle-caused tree mortality in and near the Maudlow-Toston and Cave Gulch fires; however, there were still localized spots of Douglas-fir beetle activity in both areas.

In the Cave Gulch and Maudlow-Toston fires, funnel trapping was implemented in 2004 in areas with isolated beetle activity, with low to moderate beetle activity, and ones with existing access. Funnel traps were also used as a “mop up” tool in areas that had been salvaged, but had a few remaining beetle-infested trees. Treatment areas were identified from aerial detection data, ground surveys and funnel trap catches of 2003. The objective of the 2004 funnel-trapping program was to reduce the amount of additional tree mortality within and adjacent to the fire perimeter.

Methods

In April 2004, 194 funnel traps were placed within the Cave Gulch and Maudlow-Toston areas. Traps were placed in groups of three and four, spaced approximately 30-50 feet apart. Trap clusters were placed approximately one-fourth mile from each other. In addition, several lines of traps were placed within the fire perimeter. Traps were placed approximately 150 feet from the fire perimeter to intercept beetles moving from fire-injured to green trees and to attract beetles into the burned areas and away from susceptible trees. Most traps were placed in blackened areas with fewer susceptible trees.

In this operational procedure, standard Douglas-fir attractants were placed in 12- to 16-cup funnel traps (PheroTech Inc. Delta B.C.). Trap contents were emptied weekly and beetle estimates were made.

During October 2004, we evaluated the effect of funnel trapping in reducing tree mortality in seven areas. Areas selected were ones with the highest trap catches in 2004. We recorded tree

data on transects beginning approximately 150 feet from the funnel trap locations. Each transect was approximately 8 feet wide and 300 feet long, radiating from funnel trap locations. Survey transects were used to evaluate approximately 100 susceptible trees (greater than 10 inches in d.b.h). Each tree evaluated was rated as: (1) healthy, (2) current and successful Douglas-fir beetle attack, (3) current and unsuccessful Douglas-fir beetle attack, and (4) successful 2003 Douglas-fir beetle attack.

Discussion and Recommendations

Prior to fires of 2000, very few trees near Cave Gulch and Maudlow-Toston fires were infested with Douglas-fir beetle. During 2001, beetles began to infest trees with high to moderate amounts of fire injury. During 2002-2003, beetles continued to infest some trees with moderate to light fire injury and a limited number of green trees both within and adjacent to the fire perimeter. Despite a large amount of susceptible host material available to Douglas-fir beetles, large-scale beetle-caused mortalities were never realized within the fire perimeter. This is probably due to timely salvage and other treatments that were implemented over the past 4 years. A small amount of mortality did occur, but was fairly isolated.

Out of 1,179 trees evaluated in the funnel-trapping areas, Douglas-fir beetle successfully attacked approximately 4% in 2004. Approximately 10% had been attacked in 2003 (Table 1). Wood borers probably attacked several trees in the Hedges area, identified as attacked by Douglas-fir beetle. During the majority of the evaluations, bark was removed to confirm successful Douglas-fir beetle attacks.

Table 1. Douglas-fir beetle frequency in areas burned in the Cave Gulch and Maudlow-Toston fires of 2000.

Area	Ave # beetles/trap	04 successful attack	04 unsuccessful attack	03 successful attack	Mortality trend	Green available trees
Hedges 11	4,000	6	0	7	Static	144
Hedges 10	4,300	0	0	12	declined	184
Hedges 3	3,000	1	0	6	declined	87
Magpie 5	13,000	0	0	23	declined	234
Blacktail 11	25,000	0	0	1	declined	110
Avalanche	16,000	21	7	32	declined	116
Timber Gulch	41,000	16	10	33	declined	129
TOTAL	106,300	44	17	114		1,004

The average number of beetles caught per trap ranged from 3,000 to 41,000 in the areas evaluated. This estimate may be low because several areas traps were on the ground during at least one collection time.

In Timber Gulch, there were eight traps. An estimated 328,000 beetles were trapped between May 11 and September 9. Studies suggest that the average number of beetles required to attack and kill mature Douglas-fir ranges between 700 and 1,500, depending upon the diameter and other attributes of the tree. It is reasonable to assume that trapping nearly 330,000 beetles saved about 330 trees in the Timber Gulch area. The Timber Gulch trapping area is approximately 4 to 5 acres in size and fairly isolated. While difficult to prove, without trapping beetles in Timber Gulch, we can assume many additional mature Douglas-fir trees would have been killed.

Previous studies have shown an annual buildup ratio for Douglas-fir beetle may range between 1:1 and 1:5, depending upon the phase of the outbreak (Furniss et al. 1979). Douglas-fir beetle outbreaks typically last between 3-5 years, but can be extended during periods of drought. The results of this survey and available information suggest that Douglas-fir beetle activity is probably declining within the fire perimeter. This data also suggest that tree mortality from Douglas-fir beetle would probably have been much higher without suppression efforts. Many larger diameter Douglas-fir trees remain throughout the fire area—especially where funnel traps were used.

This survey and other information suggest there are still areas where the use of either funnel traps or MCH would be appropriate. We suggest that further survey and suppression efforts be considered in the Avalanche, Magpie and Timber Gulch areas. We anticipate further declines in DFB-caused mortality within the perimeters of the Cave Gulch and Maudlow-Toston fires in 2005.

/s/ Nancy J. Sturdevant

Forest Health Protection
Forest Entomologist
Missoula Field Office

/s/ Ken Gibson

Forest Health Protection
Forest Entomologist
Missoula Field Office

References

- Furniss, M.M., McGregor, M.D., Foiles, M.W., Partridge, A.D. 1979. Chronology and characteristics of a Douglas-fir beetle outbreak in northern Idaho. Gen. Tech. Report INT-59. Ogden, UT, USDA Forest Service, Intermountain Forest and Range Experiment Station. 19p.
- Gibson, K.E., Lieser, E., Ping, B. 1999. Bark beetle outbreaks following the Little Wolf fire. USDA For. Serv. North. Reg. Forest Health Protection Report 99-7.